

Form PTO-1390 TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371		U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE	ATTORNEY'S DOCKET NUMBER US 17024 U.S. APPLICATION NO. 09/700886
INTERNATIONAL APPLICATION NO. PCT/EP00/02196	INTERNATIONAL FILING DATE March 13, 2000	PRIORITY DATE CLAIMED April 2, 1999	
TITLE OF INVENTION COUPLING METAL PARTS WITH A PLASTIC MATERIAL		DATE: November 21, 2000	
APPLICANT(S) FOR DO/EO/US Basell Technology Company BV			
Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:			
<p>1. <input checked="" type="checkbox"/> This is a FIRST submission of items concerning a filing under 35 U.S.C. 371.</p> <p>2. <input type="checkbox"/> This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371.</p> <p>3. <input checked="" type="checkbox"/> This express request to begin national examination procedures (35 U.S.C. 371(f) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(l)).</p> <p>4. <input type="checkbox"/> A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.</p> <p>5. <input checked="" type="checkbox"/> A copy of the International Application as filed (35 U.S.C. 371(c)(2)) a. <input type="checkbox"/> is transmitted herewith (required only if not transmitted by the International Bureau). b. <input checked="" type="checkbox"/> has been transmitted by the International Bureau. c. <input type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US).</p> <p>6. <input type="checkbox"/> A translation of the International Application into English (35 U.S.C. 371(c)(2)).</p> <p>7. <input checked="" type="checkbox"/> Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)) a. <input type="checkbox"/> are transmitted herewith (required only if not transmitted by the International Bureau). b. <input type="checkbox"/> have been transmitted by the International Bureau. c. <input type="checkbox"/> have not been made; however, the time limit for making such amendments has NOT expired. d. <input checked="" type="checkbox"/> have not been made and will not be made.</p> <p>8. <input type="checkbox"/> A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).</p> <p>9. <input checked="" type="checkbox"/> An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).</p> <p>10. <input type="checkbox"/> A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).</p>			
Items 11. to 16. below concern other document(s) or information included:			
<p>11. <input type="checkbox"/> An Information Disclosure Statement under 37 CFR 1.97 and 1.98.</p> <p>12. <input checked="" type="checkbox"/> An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.</p> <p>13. <input type="checkbox"/> A FIRST preliminary amendment. <input type="checkbox"/> A SECOND or SUBSEQUENT preliminary amendment.</p> <p>14. <input type="checkbox"/> A substitute specification.</p> <p>15. <input type="checkbox"/> A change of power of attorney and/or address letter.</p> <p>16. <input checked="" type="checkbox"/> Other items or information: Preliminary Amendment Receipt acknowledgment card Express Mailing Certificate</p>			

U.S. Application No. 09/700886		International Application No. PCT/EP00/002196	Attorney's Docket No. US 17024		
17. <input type="checkbox"/> The following fees are submitted:				CALCULATIONS	PTO USE ONLY
Basic National Fee (37 CFR 1.492(a)(1)-(5)): Search Report has been prepared by the EPO or JPO. \$ 860					
International preliminary examination fee paid to USPTO (37 CFR 1.482). . .					
No international preliminary examination fee paid to USPTO (37 CFR 1.482) but international search fee paid to USPTO (37 CFR 1.445(a)(2))					
Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO					
International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(2)-(4). . . .					
ENTER APPROPRIATE BASIC FEE AMOUNT =				860	
Surcharge of \$130.00 for furnishing the oath or declaration later than [] 20 [] 30 months from the earliest claimed priority date (37 CFR 1.492(e)).				\$ -0-	
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total claims	12 - 20	-0-	x 18	\$ -0-	
Indep. claims	1 - 3	-0-	x 80	\$ -0-	
Multiple dependent claim(s) (if applicable)				+ 270	\$ -0-
				TOTAL OF ABOVE CALCULATIONS = \$ 860	
Reduction by 1/2 for filing by small entity, if applicable. Verified Small Entity statement must also be filed. (Note 37 CFR 1.9, 1.27, 1.28).				\$	
				SUB TOTAL = \$ 860	
Processing fee \$130.00 for furnishing the English translation later than [] 20 [] 30 months from the earliest claimed priority date (37 CFR 1.492(f)).				\$	
				TOTAL NATIONAL FEE = \$ 860	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property +				\$ 40	
				TOTAL FEES ENCLOSED = \$ 900	
				Amount to be: refunded	\$
				charged	\$
a. <input type="checkbox"/> A check in the amount of \$_____ to cover the above fees is enclosed. b. <input checked="" type="checkbox"/> Please charge my Deposit Account No. <u>08-2336</u> in the amount of \$ <u>900.00</u> to cover the above fees. Two copies of this sheet are enclosed. c. <input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. <u>08-2336</u> . Two copies of this sheet are enclosed.					
NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to review (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.					
SEND ALL CORRESPONDENCE TO: Basell North America Inc. Intellectual Property & Licensing 912 Appleton Road Elkton, Maryland 21921 phone: 410-996-1646 fax: 410-996-1560					
 Signature Margaret S. Millikin Name 38,969 Registration Number November 21, 2000 Date					

legal/17024 prelim

US 17024

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re patent application of)
Gian Luigi Rigosi et al.)
Serial No. Not yet assigned)
Filed November 21, 2000)
PCT International Appln PCT/EP00/01216)
Filed March 13, 2000)
For COUPLING METAL PARTS WITH)
A PLASTIC MATERIAL)

Box PCT
Assistant Commissioner of Patents
Washington, D.C. 20231

Sir:

PRELIMINARY AMENDMENT

Please amend this application without prejudice as follows:

In the Claims

In claim 2, line 1, after "claim 1", please insert --further--.

In claim 3, line 1, please delete "or 2" and before "comprising" insert --further--.

In claim 4, please delete "claims 1-3" and substitute therefor --claim 1-- and after "wherein" delete --a--.

In claim 5, please delete "claims 1-3" and substitute therefor --claim 1--.

Please add the following claims:

6. (New) The process of claim 2 further comprising the step of applying an organic or inorganic primer to the metal surface before applying a powder of an adhesive polymer composition to the metal surface.
7. (New) The process of claim 2 wherein pressure is applied during step (c).
8. (New) The process of claim 3 wherein pressure is applied during step (c).
9. (New) The process of claim 6 wherein pressure is applied during step (c).
10. (New) Articles obtainable by the process according to claim 2.
11. (New) Articles obtainable by the process according to claim 3.
12. (New) Articles obtainable by the process according to claim 6.

An early and favorable action on the merits is solicited earnestly.

Should the Examiner have questions or comments regarding this application or this amendment, Applicants' attorney would welcome the opportunity to discuss the case with the Examiner.

Respectfully submitted,

GIAN LUIGI RIGOSI ET AL.

By Margaret S. Millikin
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November 21, 2000

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COUPLING METAL PARTS WITH A PLASTIC MATERIAL

The present invention relates to a process for coupling the surface of metal parts with plastic materials. In particular, it relates to a process for coating metal parts with plastic materials by injection moulding and to articles obtainable from the said process.

Number articles employed in a lot of fields present a coupling between a plastic material and the surface of a metal part. The process of the present invention is suitable for preparing the said articles. The reasons for making the said coupling are various. For example, the coating of metal parts is sometimes necessary to prevent the metal surface from coming in contact with foods or being exposed to chemical substances during use. Examples of the articles obtainable from the process of the present invention are, therefore, closures. Bottle closures of a plastic material are joined to a metallic material, aluminium for example, in order to prevent the oxygen diffusion in bottles.

In industry it is also necessary to connect different parts, such as metal valves, metal fittings or metal pipes with pipes or fittings of a plastic material.

Methods for joining metal surfaces to plastic materials are already known. In particular a method for coupling a metal part with plastic materials by a injection moulding process is known. International patent application WO 96/14533 describes such a process. According to the described invention, the method involves the steps of applying an organic or inorganic primer to the metallic pipe or pipe fitting, then applying heat to the metallic pipe end or fitting and, subsequently, hot dipping the metallic pipe or pipe fitting into a fluidised bed of plastic material. The subsequent and last step is that of overmoulding the metallic pipe or pipe fitting with a plastic material by an injection moulding process.

The problem with the method disclosed in said patent application is that the adhesion strength between the metallic pipe and the plastic material is not high.

It has now been found a process that improves the adhesion strength between the metallic surface and the plastic material.

In addition, thanks to the process of the present invention a higher adhesion strength is obtained without damaging the coating of plastic material. In fact the chemical degradation of the polymer does not occur or is reduced to the minimum.

Moreover, the present process does not even cause the loss of the shape of the overmoulded plastic material due to the action of heat.

Accordingly, the present invention provides a process for effecting a coupling between a plastic material and the surface of a metal part (metal surface) comprising the steps of:

- a) applying an adhesive polymer composition on the metal surface;
- b) overmoulding the metal surface with a plastic material by injection moulding; and
- c) applying heat to the metal surface.

The said metal surface can be the overall surface of the metal part of a portion of it, depending upon the kind of coupled article to be produced.

The part to be coupled with a plastic material can be of any type of metal or metal alloy. Examples of suitable metals and metal alloys are iron, aluminium, copper, steel and brass.

The part to be subjected to the process of the present invention may optionally be plated or treated with surface treatments generally employed in the art. Hence, a chromium or zinc plated part is suitable as well, for instance.

The adhesive polymer composition used in step (a) is preferably compatible with the polymer used for overmoulding the metal surface in step (b). The adhesive polymer could be the same polymer as the polymer used for the overmoulding, for example.

The adhesive polymer composition preferably comprises a polymer modified by grafting it with modifying agents containing functional groups. All the said adhesive polymer compositions available in the art are suitable. The modification of the polymer is obtained according to known processes, by mixing the polymer and modifying agent (such as maleic anhydride or isophorone bismaleamic acid or acrylic acid) either in the molten state or in solution, preferably in the presence of radical initiators such as organic peroxides. It is obtained a partial or total grafting of the modifying agent in quantities ranging from 0.5 to 10%.

Examples of suitable modified polymers are as follows (all the percentages being by weight):

- I) random copolymers of propylene with 0.5-10% of a $\text{CH}_2=\text{CHR}$ olefin, wherein R is selected from H and a linear or branched $\text{C}_2\text{-C}_4$ alkyl radical, modified with the said polar groups in quantities from 0.002 to 10%;
- II) polyolefin compositions comprising by weight:

- a) 30-94%, preferably 54-85%, of polypropylene or polyethylene (HDPE, LDPE or LLDPE) or a propylene/ethylene or propylene/ethylene/C₄-C₁₀ α -olefin crystalline random copolymer;
- b) 0-70%, preferably 5-40%, of an ethylene/propylene or ethylene/1-butene elastomeric copolymer; and
- c) 0.5-10%, preferably 2-6%, of polypropylene or polyethylene (HDPE, LDPE or LLDPE) modified with the said polar groups in quantities from 0.5 to 10%.

Preferably the adhesive polymer composition also contains from 0.1 to 0.5% by weight of a nucleating agent, such as dibenzylidenesorbitol or talc, and from 0.1 to 10% by weight of titanium dioxide.

Preferably, the above-mentioned α -olefin is selected from 1-butene, 1-pentene, 1-hexene, 4-methyl-1-pentene and 1-octene. Particularly preferred is 1-butene.

Polymer compositions (II) may be prepared blending the components or by sequential polymerisation of the monomers in the presence of stereospecific Ziegler-Natta catalysts supported on magnesium dihalides in active form as described in EP-A-483523, for example.

The method for applying the adhesive polymer composition to the metal surface of the part is not critical. For example, the adhesive polymer composition may be applied by injection moulding or dipping the part into a fluidised bed of polymer powder. Other suitable methods for applying the adhesive polymer in form of powder are by flame spraying or spraying on pre-heated parts or using spray guns equipped with a system for the electrostatic charge of the powders. Alternatively, the extrusion process can be used when the shape of the part is simple. Depending upon the method, the metal surface is heated before or after applying the adhesive polymer composition.

The plastic material that is overmoulded over the metal surface may include thermoplastics such as polyolefins, e.g. homo- or copolymers of ethylene, propylene and 1-butene and polyamides. An example of said polyolefins is an heterophasic polymer composition comprising (percentage by weight):

- 30-90% of a crystalline propylene homopolymer with an insoluble fraction in xylene at ambient temperature greater than 90, or a crystalline random copolymer of propylene with ethylene and/or a CH₂=CHR olefin where R is a C₂-C₆ alkyl radical,

containing more than 85% of propylene and having an insoluble fraction greater than 85%;

- 0-40% of a polymer fraction containing ethylene, insoluble in xylene at ambient temperature (i.e. about 23°C); and
- 10-60% of an amorphous ethylene/propylene copolymer, optionally containing minor amounts of a diene, soluble in xylene at ambient temperature and containing 10-70% of ethylene.

Examples of above heterophasic polymer compositions are described in published European patent applications Nos. 400333 and 472946.

The plastic material can include other components commonly used in the art, such as filler and pigments.

In step (c) heat is applied to the metal surface by induction, for example. A way of applying induction heat is by induction furnace.

The metal surface is heated up to a temperature that causes the softening or melting of the overmoulded plastic material in contact with the metal. Consequently, the temperature depends on the type of used plastic material. For example, when the plastic material is a propylene polymer, the metal surface can be heated at a temperature of 180-220°C.

In order to define how much energy is necessary to heat the coated metal surface at the desired temperature, a way could be to determine it on a metal surface that is not coated.

The process of the present invention optionally comprises the step of applying an organic or inorganic primer to the metal surface before the step of applying an adhesive polymer composition to the metal surface. Examples of suitable primers are epoxy resins and chromates.

When heat is applied during step (c), a pressure is optionally applied to the part and/or to the overmoulded plastic material to increase the adhesion between the metal surface and the plastic material. The pressure is applied by rolling or using moulds, for instance. The type of part and of used polymers affect the values of pressure to be applied. The applied pressure can be selected in the range from 0.01 to 5 MPa. When the pressure is applied by using a mould, the pressure is preferably maintained for 5 seconds or less.

The following examples are given to illustrate but not limit the present invention.

The data relating to the compositions and samples of the examples are determined by

way of the methods indicated below:

- Melt Index (MIL): ASTM D 1238, condition L
- Solubility in xylene: (see note below)
- Intrinsic viscosity: determined in tetrahydronaphthalene at 135°C
- Peeling test: NF A 49 711 at room temperature.

Note

Determination of percentage soluble in xylene: one prepares a solution of the sample at a concentration of 1% by weight, maintaining the temperature at 135°C, and stirring the solution for one hour and then cooling the solution to room temperature. The solution is then filtered and acetone is added to a portion of the filtrate in order to obtain the precipitation of the polymer dissolved. The polymer is then recovered, washed, dried, and weighed in order to determine the percentage soluble in xylene.

Polymers used in the examples

- Adhesive polymer composition comprising (percentage by weight):
 - a) 74% of a crystalline poly(propylene-*co*-butene-1-*co*-ethylene), containing about 8% and 2% of recurring units derived from butene-1 and ethylene respectively, containing a minor fraction soluble in xylene at room temperature;
 - b) 20% of a random copolymer of propylene with 15% of recurring units derived from ethylene, having a soluble fraction in xylene at 23°C of 50%;
 - c) 5% of a polypropylene grafted with 1.5% maleic anhydride; and
 - d) 1% of TiO₂.

The polymers are obtained by polymerizing the olefin monomers in the presence of a high yield Ziegler-Natta catalyst.

The polymer composition is stabilised against thermal and UV ageing using known additives and visbroken with peroxides up to an MIL of 140 dg/min. Its average particle size is 250µm obtained by way of cryogenic grinding.

- Heterophasic polymer composition having an MIL of 3.5 dg/min and consisting of the following polymers (percentage by weight):
 - 79 % of a crystalline propylene homopolymer containing 2.5% of a fraction soluble in xylene at 23°C; and
 - 21% of a random elastomeric copolymer consisting of 87% of recurring units derived

from propylene and 13% from ethylene.

The fraction soluble in xylene at 23°C of the said heterophasic composition has an intrinsic viscosity value of 3 dl/g.

The said composition is obtained by way of sequential polymerisation by using a high yield and highly stereospecific Ziegler-Natta catalyst, supported on magnesium chloride.

Comparative Example 1c

A sandblasted plate of carbon steel having dimensions of 124×124×1.5 mm is coupled with a plastic material according to the following process.

Step (a): The plate is heated in an oven at 250°C and then dipped into a fluidised bed (5 seconds) containing a powder of the adhesive polymer composition. The plate thus coated is allowed to cool in the open air. The coating is 300-400µm thick. The adhesion of the plastic coating to the metal is classified 5B according to the ASTM D 3359 method.

Step (b): The plate thus coated is introduced into an injection moulding apparatus. The hollow of the mould has dimensions 126 mm × 126 mm and 4 mm thick.

A layer of the said heterophasic polymer composition is overmoulded over the plate coated with the modified polymer by injecting the heterophasic composition in the mould at a temperature of 260°C. The thus obtained layer is 2-2.2 mm thick.

The peel strength of the plastic material to the carbon steel sheet is 0-2 N/mm.

Example 1

The plate coming from step (b) of Comparative Example 1c is subjected to the following step.

Step (c): The plate coupled with the plastic material is heated to a temperature of 180-220°C by use of an induction furnace and subjected to a rolling at the same time. The applied pressure is about 0.1 MPa.

The peel strength of the plastic material to the carbon steel plate at room temperature is 6.5-7 N/mm.

CLAIMS

1. A process for effecting a coupling between a plastic material and a metal surface comprising the steps of:
 - a) applying a powder of a adhesive polymer composition to the metal surface;
 - b) overmoulding the metal surface with a plastic material by injection moulding; and
 - c) applying heat to the metal surface.
2. The process of claim 1 comprising the step of heating the metal surface before or after applying the adhesive polymer composition.
3. The process of claim 1 or 2 comprising the step of applying an organic or inorganic primer to the metal surface before applying a powder of an adhesive polymer composition to the metal surface.
4. The process of claims 1-3 wherein a pressure is applied during step (c).
5. Articles obtainable by the process according to claims 1-3.

COMBINED DECLARATION FOR PATENT APPLICATION AND POWER OF ATTORNEY (Includes Reference to PCT International Applications)		ATTORNEY'S DOCKET NUMBER US 17024
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As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

Coupling metal parts with a plastic material.

the specification of which (check only one item below):

is attached hereto.
 was filed as United States application

Serial No. _____

on _____,

and was amended

on _____ (if applicable).

was filed as PCT international application

Number PCT/EPO0/02196

on 13 March 2000,

and was amended under PCT Article 19

on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed:

PRIOR FOREIGN/PCT APPLICATION(S) AND ANY PRIORITY CLAIMS UNDER 35 U.S.C. 119:

COUNTRY (If PCT indicate "PCT")	APPLICATION NUMBER	DATE OF FILING (day, month, year)	PRIORITY CLAIMED UNDER 35 USC 119
EP	99201014.0	2 April 1999	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
			<input type="checkbox"/> YES <input type="checkbox"/> NO
			<input type="checkbox"/> YES <input type="checkbox"/> NO
			<input type="checkbox"/> YES <input type="checkbox"/> NO
			<input type="checkbox"/> YES <input type="checkbox"/> NO

Combined Declaration For Patent Application and Power of Attorney (Continued) (Includes Reference to PCT International Applications)		ATTORNEY'S DOCKET NUMBER US 17024																														
<p>I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) or PCT international application(s) designating the United States of America that is/are listed below, and insofar as the subject matter of each of the claims of this application is not disclosed in that/those prior application(s) in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application(s) and the national or PCT international filing date of this application:</p>																																
PRIOR U.S. APPLICATIONS OR PCT INTERNATIONAL APPLICATIONS DESIGNATING THE U.S. FOR BENEFIT UNDER 35 U.S.C. 120:																																
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POWER OF ATTORNEY: As a named Inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. (List name and registration number)																																
<p><i>2</i> Margaret S. Millikin, Reg. No. 38,969 Joanne W. Patterson, Reg. No. 31,217</p>																																
Send Correspondence to: Margaret S. Millikin Basell North America Inc. Intellectual Property 912 Appleton Road Elkton, Maryland 21921		Direct Telephone Calls to: (name and telephone number) Margaret S. Millikin 410-996-1646																														
201	FULL NAME OF INVENTOR	FAMILY NAME <u>RIGOSI</u>	FIRST GIVEN NAME <u>Gian Luigi</u>	SECOND GIVEN NAME																												
	RESIDENCE & CITIZENSHIP	CITY <u>Ferrara</u>	STATE OR FOREIGN COUNTRY <u>Italy</u>	COUNTRY OF CITIZENSHIP <u>Italy</u> <i>ITX</i>																												
	POST OFFICE ADDRESS	Via Pomposa 40	CITY <u>44100 Ferrara, Italy</u>	STATE & ZIP CODE/COUNTRY <i>ITX</i>																												
202	FULL NAME OF INVENTOR	FAMILY NAME <u>GOBERTI</u>	FIRST GIVEN NAME <u>Paolo</u>	SECOND GIVEN NAME																												
	RESIDENCE & CITIZENSHIP	CITY <u>Vigarano Mainarda</u>	STATE OR FOREIGN COUNTRY <u>Italy</u>	COUNTRY OF CITIZENSHIP <u>Italy</u>																												
	POST OFFICE ADDRESS	Via Fondo Reno 53	CITY <u>44049 Vigarano Mainarda Ferrara, Italy</u>	STATE & ZIP CODE/COUNTRY <i>ITX</i>																												
203	FULL NAME OF INVENTOR	FAMILY NAME	FIRST GIVEN NAME	SECOND GIVEN NAME																												
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<p>I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.</p>																																
SIGNATURE OF INVENTOR 201 <i>Gian Luigi Rigosi</i>		SIGNATURE OF INVENTOR 202 <i>Paolo Goberti</i>		SIGNATURE OF INVENTOR 203																												
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